REPLY
DISTRIBUTION OF SUBMARINE CEMENTS IN A MODERN CARIBBEAN FRINGING REEF, GALETA POINT, PANAMA

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Alexandersson's discussion indicates that our descriptions and interpretations of some characteristics of submarine cements are similar. Unfortunately, he apparently has misunderstood my points concerning the occurrence and significance of peloids in these cements, and therefore believes that I misquoted him.

My description of Galeta reef cements (Macintyre 1977) noted—as have other reports (see p. 508)—a distinct difference in crystal size between (a) submicrocrystalline (4μ) nuclei of peloids, and (b) microcrystalline (4–30μ) radiating dentate rims (Fig. 1A). I proposed that commonly, magnesium calcite precipitates initially as submicrocrystalline peloids (20–60μ in diameter) by repeated nucleation rather than by continued enlargement of peloids; and that coarser dentate crystals not restricted to peloid surfaces are a later stage of slower and more organized precipitation of magnesium calcite cement. In other words, the peloids represent a distinct initial stage of precipitation and not a continuing phase, as suggested by Alexandersson's "growth front."

The result of this mode of precipitation is a relatively restricted size range of peloids that may coalesce to form (a) dense submicrocrystalline calcite having a relict peloidal/clotted texture, or (b) porous peloidal calcite (see Alexandersson's Fig. 1E). If in the latter case precipitation of calcite proceeds, the peloids become coated with the coarser calcite crystals, which commonly infill the void space between them (Fig. 1B).

The general size restriction of peloids observed by many workers—comparable in size to peloids of aragonite formed by "repeated nucleation" in laboratory experiments (Taylor and Illing, 1969)—does not support a "growing front" hypothesis according to which dense magnesium calcite would form as a result of peloids continuously increasing in size. To date, such a gradation in size of peloids towards dense cement has not been reported. On the contrary, where peloid size can be identified in relict textures of dense magnesium calcite cements, it does not differ significantly from pelloid size of adjacent open peloid infillings (Fig. 1C). It should be emphasized, however, that all dense magnesium calcite cements in the Galeta material do not exhibit a clotted or peloidal texture, and I do not infer that all dense submicrocrystalline cements have an initial peloidal stage of precipitation.

My use of the term "secondary" apparently has led to some confusion. In the passage Alexandersson quotes, I was referring to magnesium calcite cements as secondary infilling or coating in the sense of material deposited penecontemporaneously with, or shortly after the deposition of reef framework and sediments. Therefore, the term was not being limited to porous submicrocrystalline calcite. This calcite—which also commonly exhibits a peloidal texture—is, in my opinion, a weakly developed cement filling of isolated cavities.

Finally, Alexandersson states that he is unaware of any proposal that peloids in submarine cements are internal sediment grains. Such a hypothesis (James et al. 1976), with which I disagree, was discussed on p. 511 of the Galeta paper.

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REFERENCES

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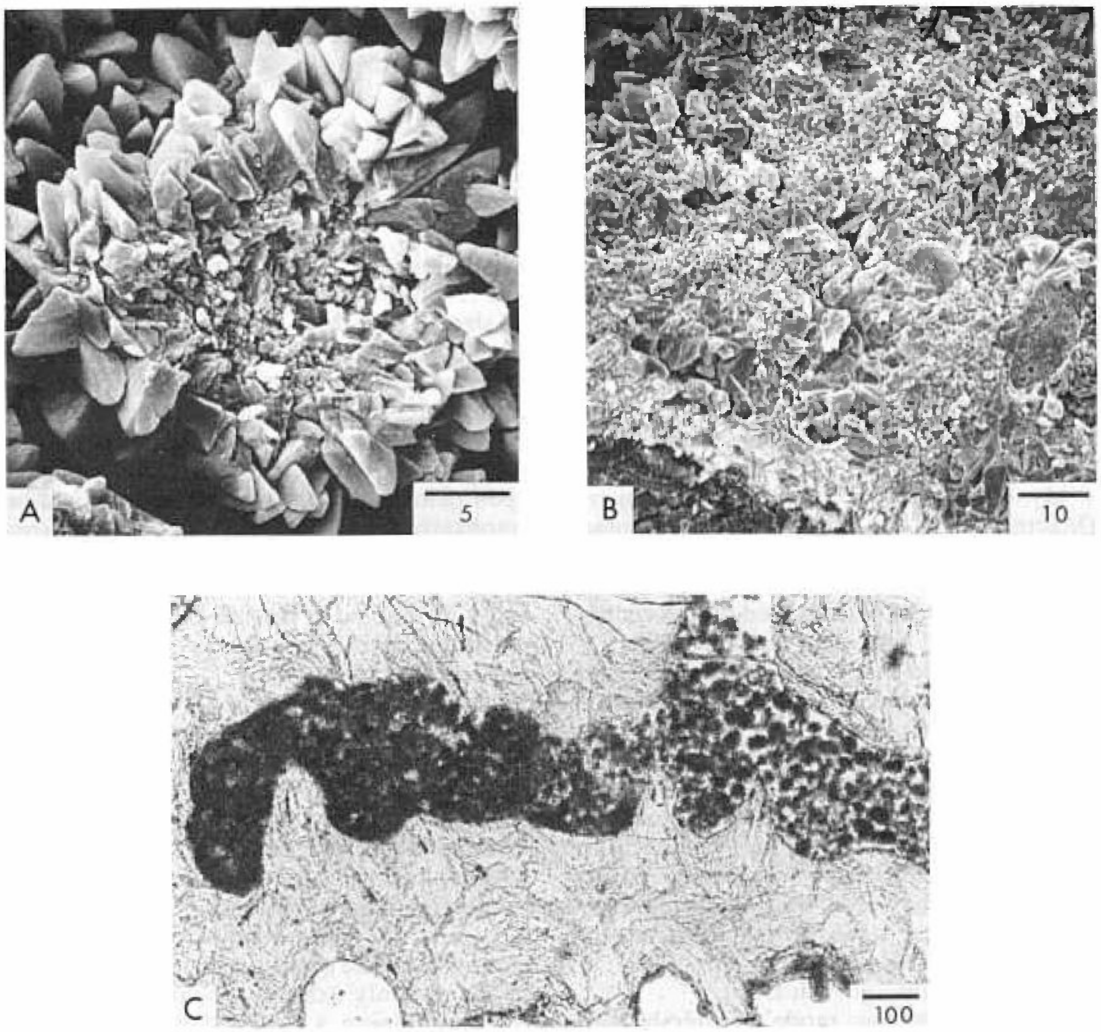

FIG. 1.—Scanning electron micrographs and photomicrograph of magnesium calcite cement from Galeta reef. Scales are in microns. A. Close-up of fractured peloid showing marked difference in crystal size between the submicrocrystalline nuclei and microcrystalline dentate rim. B. Dense "non-uniform" magnesium calcite cement formed by precipitation of coarser dentate crystals around peloids and skeletal grains. C. Peloidal infilling of coral skeletal cavity. Note similar size of peloids in dense coalesced infillings and in open peloidal infillings.